The mud volcanoes in Kumano basin examined by seismic profiles

Koji Ichihashi[1], Yasuyuki Nakamura[2], Shin'ichi Kuramoto[3], Akira Takeuchi[4]

[1] Earth Sci., Toyama Univ, [2] Ocean Res. Inst., Univ. Tokyo, [3] JAMSTEC, [4] Dept. Earth Sci., Toyama Univ.

Kumano basin is one of the Fore-arc basins along the landward slope of Nankai trough where Philippine Sea plate subducts under southwestern Japan arc. Several mud volcanoes had discovered by acoustic imaging with the side-scan sonar IZANAGI and submersible research with the manned submersible Shinkai 6500. Those mud volcanoes distribute nearby active faults at the western part of Ensyu fault system on the central Kumano basin.

In this report, we analyzed the multichannel seismic reflection data which were acquired during the KT-02-1 cruise from March 8th - 12th 2002. Then, we interpreted the seismic profile about inner structures of mud volcanoes as well as deformation structures such as faults and folds and sedimentary structures in the Kumano basin. Through those profiles, compaction and consolidation proceed being in lower sedimentary layers, where right-lateral strike-slip faults are probable.

We confirmed reflection surfaces correlatable to the carbonate rock. Inside a mud volcano, the No.3 Kumano knoll (KK-3), a couple of reflection surfaces indicate multiple activities of the mud volcano.

The analyzed sedimentary and deformation structures suggest a possible mechanism for the formation of the mud volcanoes in Kumano basin; local high pore-pressure at the terminals of strike-slip faults, Ensyu fault system, cause mud diapirism and eruption to form mud volcanoes.